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The prevalence of osteoporosis and osteopenia in persons attending a tertiary care hospital in Mumbai

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Abstract
Background: Osteoporosis is one of the common health problems with a progressive prevalence both in developed and developing countries. The different method are used to quantify osteoporosis like DEXA and Quantitative ultrasound (QUS). So study was mainly done to determine the prevalence of osteopenia and osteoporosis in patients attending OPD at tertiary care hospital and to compare the BMD in relation to modifiable and non-modifiable risk factors.

Method and Materials: A prospective cross sectional study carried out in the orthpedic OPD of Dr RN Cooper Medical Hospital, Mumbai over the period of 6 months from June 2017 to November 2017. The study include 186 cases which include all patients attending OPD from 19 yrs to 90 yrs and those who were willing to give consent for study. BMD was tested using calcaneal quantitative ultrasound (BMD SONOST 2000) machine. The results were tabulated and analysed statistically. Test of significance (chi square test and Z test) were applied wherever necessary.

Result: The prevalence of Osteoporosis in our study was 14.51% and prevalence of Osteopenia was 58.06% as per WHO criteria. In our study, we found that osteoporosis and osteopenia is more common in female with most common age is more than 40 yrs. The menopausal female, smoker and patients from lower socioeconomic strata have low BMD score.

Conclusion: Osteoporosis is more prevalent in our society than it is seen so awareness of people about osteoporosis, good dietary habits, active life style, good control of systemic disorders, reduced intake of tobacco can make a huge difference in osteoporotic complication rate in our society.

Keywords: BMD- Bone mineral density, DEXA- dual X-ray absorptiometry, osteoporosis, osteopenia, Tscore

Introduction

Osteoporosis is one of the common health problems with a progressive prevalence both in developed and developing countries [1, 2].

The definition of Osteoporosis based on World Health Organization (WHO) criteria is reduction in bone mineral density (BMD) of 2.5 standard deviations or more below that of the mean peak BMD of young adults when measured by dual-energy x-ray absorptiometry (DEXA). This condition is influenced by different risk factors in terms of sex and age [3].

In accordance with the recent estimation of International Osteoporosis Foundation (IOF) there are 200 million osteoporotic women in the world with an accident of osteoporotic fracture every 3 seconds. By 2050, the worldwide incidence of hip fracture is expected to rise by 240% in women and 310% in men compared to 1990 involving approximately 1.66 million in 1990 to 6.26 million in 2050 [4].

Although exact numbers are not available, based on available data and clinical experience, an estimated 50 million Indians may be affected, as

Reported [5]. A systematic review showed that the costs of osteoporosis treatment were not only greater than pre-fracture costs (as 1.6-6.2 times), but also were more than those spent for matched controls (2.2-3.5 times) [6]. Thus, due to the rapid growth in burden and cost of osteoporosis worldwide, it will be reasonable to focus on reduction of fractures as the main goal of treatment. Diagnosis of osteoporosis Bone strength can be defined using BMD (70%) and bone quality (20%). It is easy to measure BMD but in clinical settings, bone quality is not measurable yet.

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Bone mineral density is measured by means of dual X-ray absorptiometry (DXA); it is the actual expression of the bone in absolute terms of grams of mineral (primarily, as g/cm2 of calcium) per square centimeter of the scanned bone. BMD measurements of the hip and spine are used to establish or confirm the diagnosis of osteoporosis to predict future fracture risk and monitor patients. The difference between the patient's BMD and mean BMD of young females aged in the range of 20-29 years (divided by the standard deviation (SD) of the reference population) yields the T-score; comparing the BMD of a particular age, sex, and ethnicity-matched adult reference population is called the Z-score [7].

Undeniably, this simplified definition of osteoporosis eases the physicians in diagnosing and initiating treatment for osteoporotic patients. However, there are several limitations of DXA which prevent it from being used in the mass screening of osteoporosis, which is currently a rising healthcare medical condition in the developing countries [8].

Quantitative ultrasound (QUS) is a bone health assessment technique

which has gained much popularity in recent years since its introduction in 1984. Compared to DXA, QUS offers wider accessibility to the public because it is portable, easier to handle, lower in cost and does not

emit ionizing radiation [9].

The main purpose of these study was to determine the prevalence of osteopenia and osteoporosis in patients attending OPD at tertiary care hospital and to compare the BMD in relation to modifiable and non-modifiable risk factors.

Method and Materials

This was a prospective cross sectional study carried out in the orthpedic OPD of Dr RN Cooper Medical Hospital, Mumbai over the period of 6 months from May 2017 to November 2017. The study include 186 cases which include all patients attending OPD from 19 yrs to 90 yrs and those who were willing to give consent for study. Pregnant ladies and females with history of chronic use of steroids and rheumatoid arthritis were excluded from the study. Also patient having old or new calcaneum fracture or who had history of tumor or calcaneum osteomyelitis were excluded from study.

Dual Energy Absorptiometry (DEXA) is the Gold Standard for bone mineral density; however, Quantitative Ultrasound (QUS) is reliable and cost-effective alternative, which was used in this study and many other similar studies [10, 11]. BMD was tested using calcaneal quantitative ultrasound (BMD SONOST 2000) machine. Quantitative Ultrasound of Calcaneus was used to calculate the BMD (Bone Mineral Density) of right heel. Machine converted the BMD values into T-Score.

All good clinical practice (GCP) guidelines were followed. Details regarding work up of patients including demographic and clinical details and history of smoking, Hypertension, Diabetes status, nutritional history, menopausal status, economic status as APL or BPL on the basis of BPL card were recorded. The results were tabulated and analysed statistically. Test of significance (chi square test and Z test) were applied wherever necessary.

Result

Out of 186 patients, 81(43.54%) were males and 105(56.45%) were females. The minimum age was 24 yrs and maximum age was 85 yrs. 138(74.19%) patients were above 40 yrs of age with most patients (30%) belongs to 50-59yrs age group as shown in Fig 1. Out of 105 females, 63(60%) were menopausal. Out of 186 patients,75 patients were Hypertensive and on antihypertensive medications. Out of 186 patients, 39 patients were diabetic and on antidiabetic medications.36 patients found to be a smoker or tobacco chewer.

The prevalence of Osteoporosis in our study was 14.51% and prevalence of Osteopenia was 58.06% as per WHO criteria. The difference in the frequency distribution of males and females in the

different BMD sub groups (normal, osteopaenia, osteoporosis) was significant (p<0.001) by chi square test. The percentage distribution of males and females in different BMD sub groups is shown in fig 2. The frequency distribution of menopausal and non-menopausal women in different BMD sub groups is shown in fig 3. The difference in the frequencies were statistically significant (p<0.001). Figure 4 shows frequency distribution of Hypertensive patients in BMD sub groups and it shows statistical significance(p<0.001). Smoking and tobacco chewer distribution in BMD subgroups is shown in Figure 5. Out of 186 patients, 116(62.36%) belongs to APL group and 70(37.63%) belongs to BPL group with distribution in BMD groups is shown in fig 6.
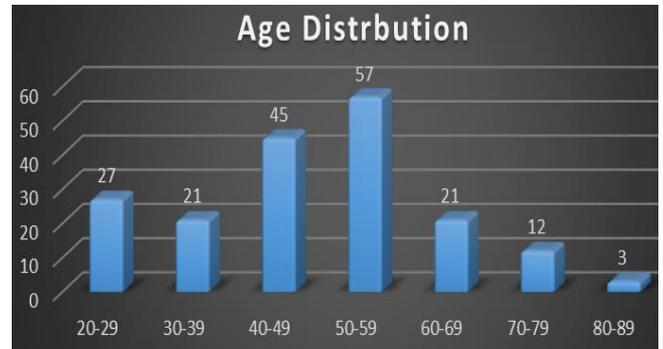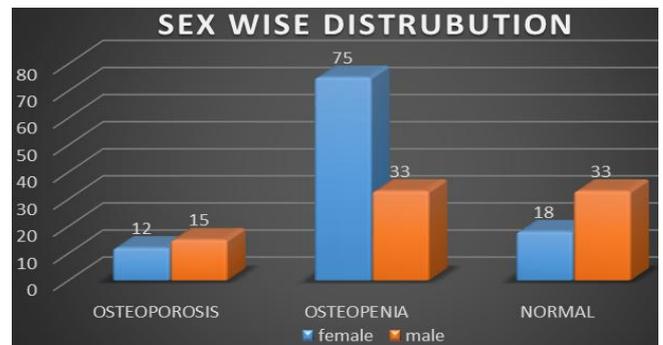

Fig 1: Age wise distribution.

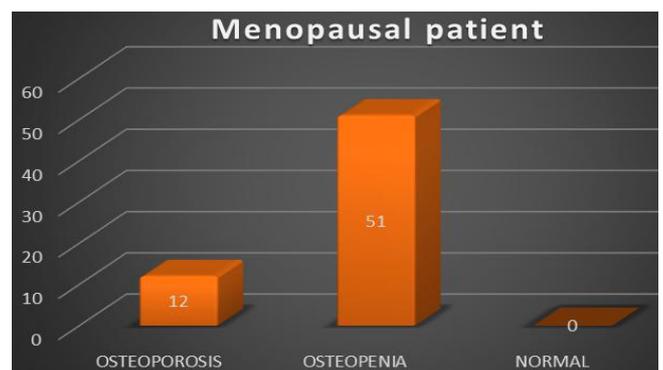**Fig 2:** Sex wise BMD Distrubution

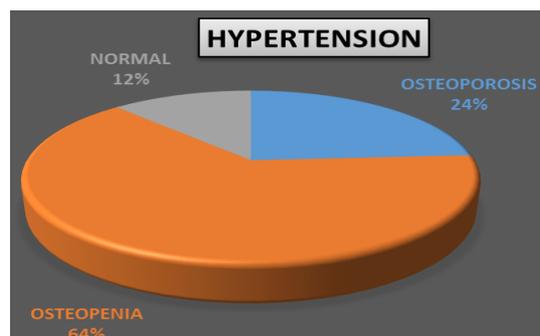**Fig 3:** BMD Distribution among Menopausal patients.

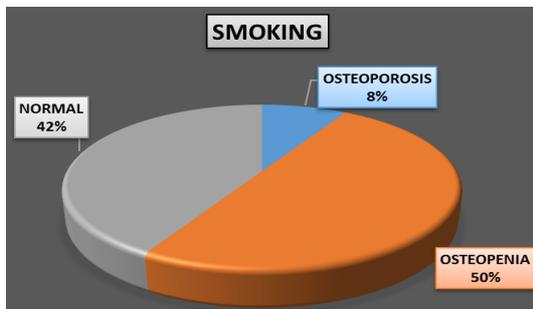**Fig 4:** BMD Distribution among Hypertensive patients.

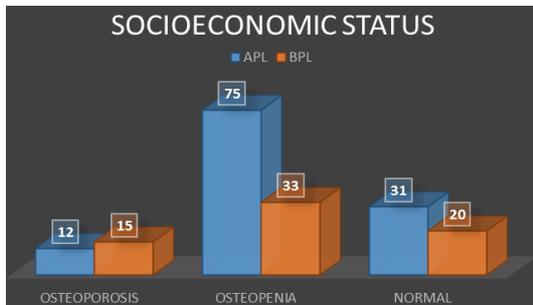**Fig 5:** BMD Distribution among Smoking population.

Fig 6: BMD distribution according to Socioeconomic status

Discussion

Osteoporosis poses one of the major health problem associated with significant morbidity, mortality and socioeconomic burden [12]. In our study, we attempted to look at the prevalence of osteoporosis and the various risk factors in people attending Tertiary care hospital as in India there is no specific database available on prevalence of osteoporosis.

In present study, we found that male female ratio is reversed compared to other studies [13, 14].The number of patient belonging to age group 50-59 is more than other groups and prevalence of osteopenia is also more in these group which state increase bone loss in relatively younger population [15].

In our study, we found prevalence of osteoporosis more in male group and prevalence of osteopenia more in female group compared to other studies [13, 14] where rates were different which may be due to many factors like genetic, nutritional, and other environmental factor which need to be looked at in further prospective studies.

In our study, we found that smoking, tobacco chewing have detrimental effect on bone quality as prevalence of osteoporosis is more compared to normal as stated in other studies [13, 14]. In female, prevalence of osteoporosis and osteopenia is more compared to normal which proved postmenopausal osteoporosis in females [16].

Higher socioeconomic strata (APL) patients have less prevalence of osteoporosis as compared to lower socioeconomic group (BPL). This was due to poor nutritional health and low education in lower socioeconomic group of society.

Conclusion

Osteoporosis is more prevalent in our society than it is seen as most of the studies done were at tertiary care hospital and most of the osteoporotic fractures came to hospital only after trauma and never had taken treatment for underlying osteoporosis.

In our study, we found that osteoporosis and osteopenia is more common in female with most common age is more than 40 yrs.

The menopausal female, smoker and patients from lower socioeconomic strata have low BMD score.

So awareness of people about osteoporosis, good dietary habits, active life style, good control of systemic disorders, reduced intake of tobacco can make a huge difference in osteoporotic complication rate in our society.

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